

REPORT ON
STRUCTURAL SAFETY & STABILITY EVALUATION OF
SRISTI GLOBAL SCHOOL
(SRISTI EDUCATION TRUST)
Sy. No.22/1, Kaveri Layout, Kodigehalli Village, KR Puram
Hobli, Bengaluru, Karnataka-560067

Name of the School: SRISTI GLOBAL SCHOOL

Investigation done by: NISHICON INFRASTRUCTURES
Non-Destructive Testing and Structural Rehabilitation
Engineering Council of India Certified, Reg: PE/00560/16/R21
#317/19, 1st G Cross, Subbanna Garden, R.P.C Layout (west) Extn,
Vijayanagara, Bengaluru, Karnataka -560040

Certified by:

Dr. N. Jayaramappa



BANGALORE

UNIVERSITY

DEPARTMENT OF CIVIL ENGINEERING

UVCE, JNANABHARATHI CAMPUS, BANGALORE 560056.

April
2022

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Sy. No.22/1, Kaveri Layout, Kodigehalli Village, KR Puram
Hobli, Bengaluru, Karnataka-560067

Name of the Building: **SRISTI GLOBAL SCHOOL**

Complete address of the Structure: **Sy. No.22/1, Kaveri Layout, Kodigehalli Village,
KR Puram Hobli, Bengaluru, Karnataka-560067**

Reference: **Letter No. NIL/2021-22 dated 04.04.2022**

Month of Testing: **April 2022**

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Name of the Building: **Sristi Global School**

PREAMBLE

Sristi Global School management has requested Nishicon Infrastructures, Bangalore to conduct structural evaluation of Sristi Global School building and to submit the evaluation report. The detailed results of investigation are given in this report.

DECLARATION

This report of building stability which is carried out on above mentioned location has 20 pages. Any clarifications regarding the report have to be brought to our notice within 15 days of report submission.

LOCATION OF STRUCTURE

Latitude: 13°00'27.2"N Longitude: 77°43'45.6"E



1. INTRODUCTION

Sristi Global School Building Management has requested Nishicon Infrastructures, Bangalore and Bangalore University to conduct structural evaluation and inspection/investigation work. The purpose of this investigation is to determine the stability of existing structure and to report its fitness by conducting various tests. Based on the field tests and inspections the conclusions are presented in this report.

2. PHYSICAL INSPECTION

- No sign of settlement of foundation was observed all around at the time of inspection.
- The top surface of concrete was observed to be even with uniform finish.
- The slab in almost majority of blocks has good appearance.
- The exterior wall of building is in good condition (work under progress).
- It was observed during inspection that the chajja and parapet wall are in good conditions.
- No structural cracks were observed in bottom portion of beams and wall junction

3. PROBING TESTS

Based on above physical observations various investigation tests are carried out on structures in order to verify the overall quality of construction.

- i. Carrying out Rebound Hammer Test to assess the surface hardness / insitu strength of concrete in existing structure.
- ii. Carrying out Ultrasonic Pulse Velocity Test to assess the quality / uniformity of concrete in in existing structure.
- iii. Dimensional measurements of structures with respect to structural drawings furnished.

The details of the individual test carried out along with equipment details and relevant standards for the same are furnished herein:



3.1. Carrying out Rebound Hammer Test to assess the surface hardness/in-situ strength of concrete

Rebound Hammer Test is a quick method for assessing the surface hardness / in-situ strength of concrete based on the surface hardness indicated by the rebound number. If the strength of concrete is high, then the rebound number is also high.

Rebound Hammer Test was carried out on various RC members viz top roof slab and available beams at random to assess the surface hardness / in-situ strength of concrete. The above test was conducted using SCHMIDT Rebound Hammer (N-Type) from M/s. **Proceq**, Switzerland as per the guidelines in Indian Standard IS: 13311 (Part-II).

The results of the tests are tabulated below. From the results of the Rebound Hammer test, it is inferred that the in-situ strength of concrete in the structure appear to surface is in the range of 22 to 34 N/Sq.mm.

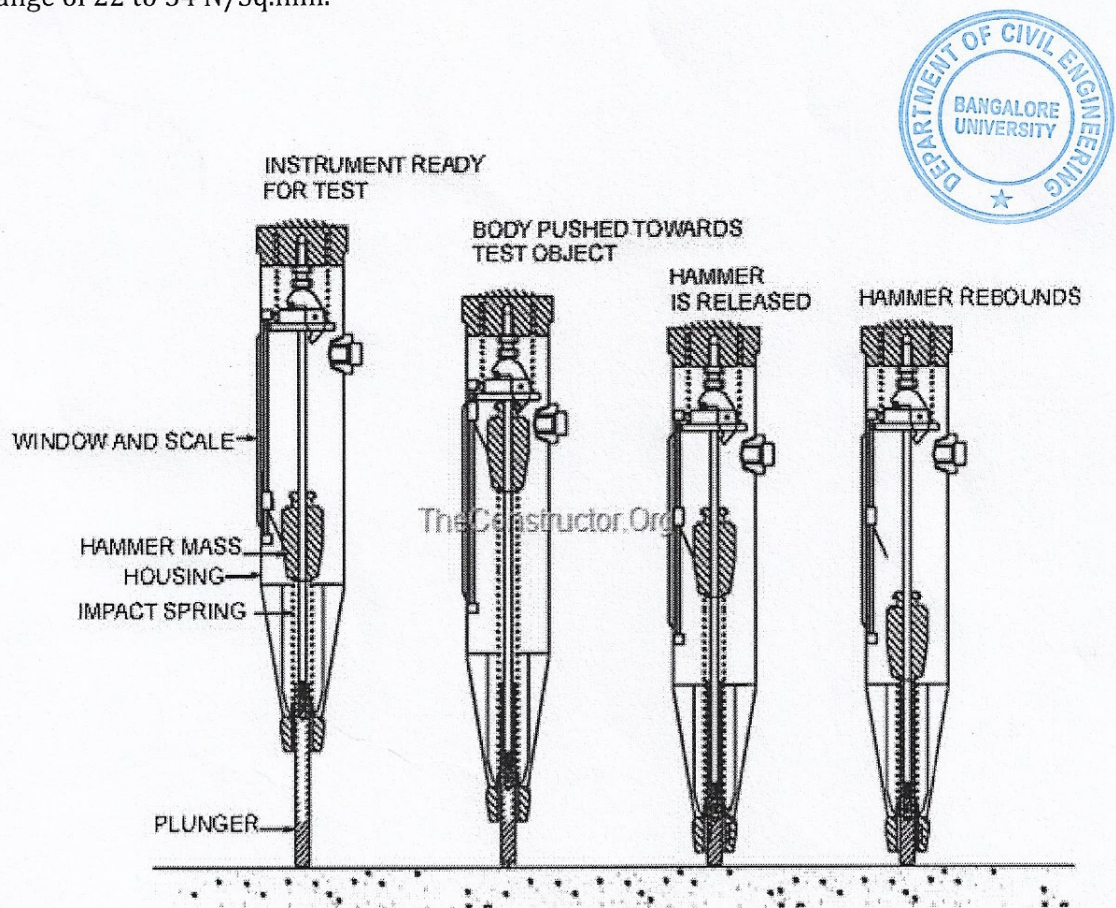
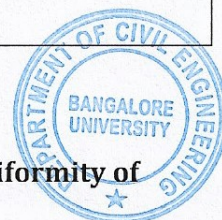


Fig. No 1 Working of rebound hammer

Table 3.1 Reference strength chart for Rebound hammer test

Rebound Number	Estimated Compressive strength Range (Mpa)
22 to 26	10 to 14
26 to 30	14 to 18
30 to 34	18 to 22
34 to 36	22 to 26
36 to 42	26 to 34
42 to 46	34 to 36



3.2. Carrying out Ultrasonic Pulse Velocity Test to assess the quality / uniformity of concrete

Ultrasonic Pulse Velocity test (UPVT) is being extensively used to assess the quality /uniformity and integrity of concrete. This test is generally used for measurement of concrete uniformity, estimation of crack depth, presence of honeycombs voids, assessment of concrete deterioration and assessment of in-situ strength (for lower grade concrete only). Ultrasonic Pulse Velocity Test was carried out on various RC members viz top roof slab and available beams at random to assess the conformity of concrete as per standard practice. The above test was conducted using "PUNDIT Lab+" (Portable Ultrasonic Non-Destructive Digital Indicating Tester) equipment with appropriate transducers from M/s. Proceq, Switzerland as per the guidelines in Indian Standard IS: 13311 (Part-I)-1992- (Reaffirmed in 2013) and also as per standard literature. Direct and in-direct method of testing was adopted depending on the site condition.

From the results of the Ultrasonic Pulse Velocity test, it is inferred that quality of concrete in the tested structure region fall under the category of "Good Concrete" as per Table-2 of IS:13311-(Part-D-1992-Reaffirmed in 2013).

The results of the tests are tabulated below.

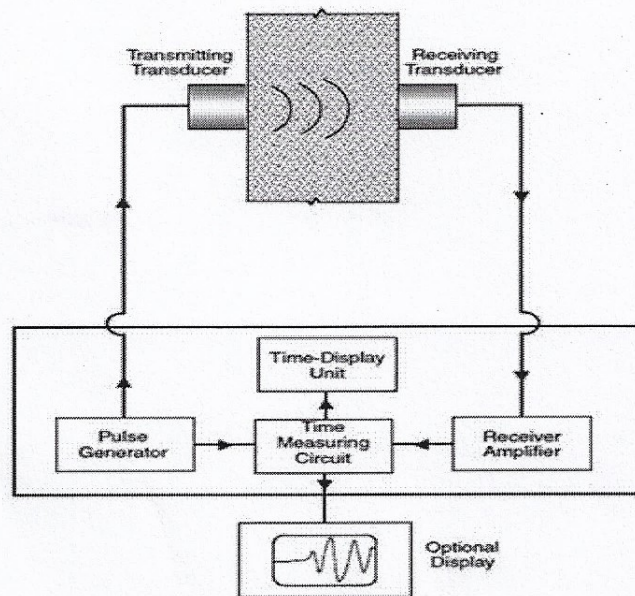


Fig. No 2 Working of Pundit

Table No 3.2 VELOCITY CRITERION FOR CONCRETE QUALITY GRADING

(I S: 13311 (Part 1): 1992 – Non-Destructive testing of concrete: Methods of tests – Ultrasonic Pulse Velocity test (First reprint September 1996))

No.	Pulse Velocity By cross probing (km / sec)	Concrete Quality Grading
1.	Above 4.5	Excellent
2.	3.5 to 4.5	Good
3.	3.0 to 3.5	Medium
4.	Below 3.0	Doubtful
Note: In case of “doubtful” quality it may be necessary to carry out further tests		



4. DETAILS OF STRUCTURE

1	Name of the Building	Sristi Global School
2	Complete Postal Address of the Building with Pin code	Sy. No.22/1, Kaveri Layout, Kodigehalli Village, KR Puram Hobli, Bengaluru, Karnataka-560067
3	No. of Floors	Basement + G+2
4	Height of Block	10.20 m
5	Length of Block	61.50 m
6	Width of Block	24.75 m
7	Total Premises area (Sm)	4046.81
8	Type of Structure	Educational Building
9	Material Used	RCC & Solid Block Masonry
10	Plan Provided	Yes
11	Structural Details Provided	No
12	Type of Roof	Reinforced Concrete Roof structure
13	Condition of Roof	Satisfactory
14	Zone of earth Quake	Zone-II

5. DETAILS OF SUB STRUCTURE

1	Name of the Building	Sristi Global School
2	Type of Foundation	Isolated
3	Depth of Foundation	-
4	Type of Soil	Red Earth Gravel Soil
5	Foundation Dimensions	-
6	Foundation details present in drawing	No
7	Condition of Foundation	Good



6. DETAILS OF MASONRY STRUCTURE

1	Name of the Building	Sristi Global School
2	Type of Masonry	Solid Cement Block Masonry
3	Material used in Masonry with Condition	Solid block with cement mortar Good
4	Condition of Wall	Good
5	Type of walls	Non- load bearing walls
6	Any visible structural cracks in masonry Elements	No
7	Any visible Hairline cracks in masonry Elements	No

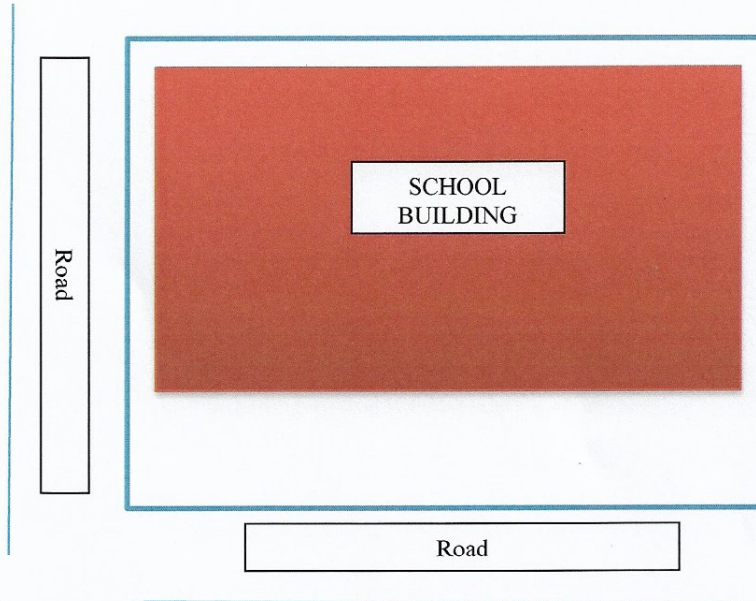
7. STAIR CASE DETAILS OBSERVED

Sl. No	Description (Doglegged)	Unit(m)	Remarks Condition
1	Length of stair case	4.00 m	Good
2	Width of Treads	0.32 m	Good
3	Height of Riser	0.15 m	Good
4	No. of Riser in a flight	11 No's + 10 No's	Good
5	Height of Hand Rails/Brick wall	-	-
6	Head Room Clearance	2.65 m	Good
7	Width of stair case	3.30 m	Good meeting the standards as per NBC



SRISTI GLOBAL SCHOOL

8. LINE SKETCH OF SCHOOL BLOCK



SRISTI GLOBAL SCHOOL

9. NDT- SCHMIDT REBOUND HAMMER FIELD DATA

Date of Testing: 05.04.2022

Test Equipment used: SCHMIDT HAMMER, M/S PROCEQ SWITZERLAND

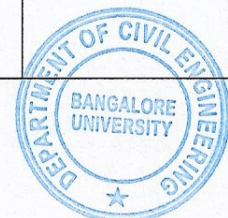
Test Method: IS13311 (Part2): 1992 RA 2013

S. No	Member Identification	Rebound Number	Average Rebound Number	Estimated Average Compressive Strength (Mpa)	Remarks
BASEMENT					
1	Column	36	36.66	26 to 34	Satisfactory
		38			
		36			
		36			
		38			
		36			
2	Beam	36	36.33	26 to 34	Satisfactory
		38			
		36			
		36			
		36			
		36			
3	Roof slab	38	38.00	26 to 34	Satisfactory
		36			
		38			
		40			
		38			
		38			
4	Stair case	38	36.66	26 to 34	Satisfactory
		36			
		36			
		38			
		36			
		36			
GROUND FLOOR					
5	Column	38	38.00	26 to 34	Satisfactory
		36			
		40			
		38			
		40			
		36			



6	Beam	38	37.00	26 to 34	Satisfactory
		36			
		34			
		38			
		40			
		36			
7	Roof Slab	40	36.66	26 to 34	Satisfactory
		36			
		34			
		36			
		38			
		36			
8	Staircase	38	37.66	26 to 34	Satisfactory
		40			
		34			
		36			
		40			
		38			

FIRST FLOOR					
9	Column	36	38.66	26 to 34	Satisfactory
		38			
		40			
		40			
		38			
		40			
10	Roof slab	38	35.33	22 to 26	Satisfactory
		34			
		34			
		36			
		38			
		32			
11	Beam	32	35.33	22 to 26	Satisfactory
		34			
		38			
		36			
		34			
		38			



Second FLOOR					
12	Column	36	37.33	26 to 34	Satisfactory
		38			
		38			
		40			
		34			
		38			
13	Beam	36	35.33	22 to 26	Satisfactory
		34			
		34			
		38			
		34			
		36			
14	Roof Slab	38	37.00	26 to 34	Satisfactory
		38			
		40			
		36			
		36			
		34			
15	Staircase	36	35.33	22 to 26	Satisfactory
		34			
		36			
		36			
		34			
		36			



10. ULTRASONIC PULSE VELOCITY TEST

FLOOR LEVEL : At All Floor Levels

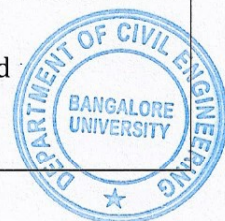
DATE : 05-04-2022.

Table.2: Ultrasonic Pulse Velocity Test Results
IS: 13311 (Part 1):1992

Sl. No	Structural Members	Ultrasonic Pulse Velocity in Km/Sec	Average Velocity Km / Sec	Concrete Quality Grading as Per IS - 13311- PART-1 Remarks Ref chart 1-2
BASEMENT				
1	Column	3.88 3.86 3.84	3.86	Good
2	Beam	3.92 3.93 3.88	3.91	Good
3	Roof slab	3.86 3.84 3.86	3.85	Good
4	Staircase	3.68 3.71 3.74	3.71	Good
GROUND FLOOR				
5	Column	3.98 3.86 3.88	3.90	Good
6	Beam	3.81 3.83 3.82	3.82	Good



7	Roof Slab	3.87 3.88 3.88	3.87	Good
8	Staircase	3.92 3.89 3.85	3.88	Good
FIRST FLOOR				
9	Column	3.89 3.92 3.83	3.88	Good
10	Beam	3.83 3.86 3.88	3.85	Good
11	Roof Slab	3.91 3.89 3.90	3.90	Good
Second FLOOR				
12	Column	3.91 3.95 3.95	3.93	Good
13	Beam	3.90 3.93 3.91	3.91	Good
14	Roof Slab	3.88 3.86 3.79	3.84	Good
15	Staircase	3.80 3.77 3.79	3.78	Good



11. INFERENCE

Based on the present condition of the building and the test result submitted by Nishicon Infrastructures, Bangalore. It is inferred that the building complies with safety and serviceability requirements as expected by the provisions of **section 35 of IS 456:2000 (Indian Standard Plain and Reinforced Concrete – Code of Practice, latest revision)**.

CONCLUSIONS

Thus, the building complies with the safety and serviceability requirements and hence the next phase of evaluation is also not necessary. Hence it is advised to repair the building by filling cracks with proper crack sealant or grouting material and building is **advisable for any tenancy or occupancy**. **The building is safe for occupancy** as per National Building Code of India-2016 guidelines and available standard code of practise.

The repair techniques are advised at later stages within next date of re-inspection

1. Plastering and Painting of existing Roof slab and walls
2. Damp proofing works at all floors
3. Crack Sealing or grouting works at visible structural cracks at some locations
4. Crack Sealing works at visible hairline cracks at some locations

DETAILS OF INSPECTION

Date of Visit: **05.04.2022**
Date of Testing: **05.04.2022**
Date of Reporting: **06.04.2022**



DECLARATION

This report of building stability which is carried out on above mentioned location has 20 pages. Any clarifications regarding the report have to be brought to our notice within 15 days of report submission.

12. PHOTOS









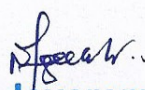




13 .0 REFERENCES

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2. IS: 13311 (part 2): 1992 – Non-Destructive Testing of concrete: Methods of Test, Part 2 – Rebound Hammer (first reprint June 1995).
3. IS: 516 – 1959, Methods of Tests for strength of concrete, (Eleventh reprint April 1985)
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